State of Oregon
Department of
Environmental
Quality

Organic Recovery Unit #2
Design and Operations Plan

For

Chemical Waste Management of the Northwest, Inc.

Arlington Facility • ORD 089 452 353
17629 Cedar Springs Lane
Arlington, Oregon

Standalone Document No. 22

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- ORGANIC RECOVERY UNIT #2

1.1 Introduction

This *Organic Recovery Unit #2 Design and Operations Plan* (Plan) establishes the design and operating standards for the Bioremediation and the Organic Recovery Unit (ORU) treatment processes.

1.2 Purpose

- To ensure compliance with all aspects of Organic waste treatment under 40 CFR §264 subparts AA,BB, and CC air emissions standards and;,
- To ensure treatment standards are achieved for all treated wastes per 40 CFR §268.40.

1.1.1 Organic Recovery Unit ORU-2

CWMNW operates two Organic Recovery Units (ORU), designated ORU-1 and ORU-2. Both ORU treatment systems are located adjacent to Containment Building B-5. ORU-1 received approval to operate in 2010 and has been operating since that time. ORU-1 is covered under *Standalone #19 – Bioremediation and Organic Recovery Unit Design and Operations Plan*.

ORU-2 was constructed and commissioned in 2016, The ORU-2 treatment unit treats listed and/or characteristic hazardous wastes using an indirect fired thermal process to reduce listed and/or characteristic hazardous wastes to the levels specified in 40 CFR Part 268. Secondary treatment methods may be required to reduce the treated listed and/or characteristic hazardous wastes to the levels specified in 40 CFR Part 268 prior to land disposal. Wastes accepted for treatment through the ORU-2 treatment system are staged inside Building B-5 and in approved containers in outside storage areas. Post-treatment solids awaiting LDR clearance or further treatment are temporarily stored in piles inside Building B-4 or B-5.

1.3 ORU-2 Treatment System

ORU-2 material handling conveyers receive material from two feed hoppers and convey the media to be treated to the ORU treatment unit. System feed conveyors are fully enclosed and ventilated to the thermal oxidizer. The ORU-2 system consists of a double pass rotary furnace that indirectly heats the media traveling through the inside of the rotary tube, and the treated media discharges at the feed end of the unit. System components subject to freezing are heat traced and insulated to prevent freezing. As-built design plans for the ORU-2 are contained in Appendix A.

1.4 Wastes Approved for Treatment

ORU-2 physically treat media with organic contamination. The following table illustrates the general waste families and possible associated RCRA Codes being treated by the system.

Table 19-1: ORU Approved Waste Codes

APPROVED EPA CODES
D001, D002, DOO3, D004, D005, D006, D007, D008, D009, D010, D011, D012, D013, D014, D015, D016, D017, D018, D019, D020, D021, D022, D023, D024, D025, D026, D027, D028, D029, D030, D031, D032, D033, D034, D035, DO36, D037, D038, D039, D040, F001, F002, F003, F005, F034, F037, F038, K001, K048, K049, K050, K051, K052, K143, K169, K170, K171, K172, P037, P059, P089, U002, U019, U031, U036, U051, U052, U060, U061, U112, U129, U140, U154, U159, U161, U165, U188, U210, U220, U228, U239

The ORU Treatment systems are made up of several subsystems that include the feed systems, an indirect fired Anaerobic Thermal Desorption Unit (ATDU), ash handling systems, vapor condensing system, process water handling and treatment systems, and air emissions control systems. A process flow diagram for the various systems is contained in Appendix B.

1.5 Waste Segregation

The treatment of the wastes with codes in Table 19-1 through the ORU system may require the isolation of process residuals dependent on the EPA codes associated with the waste being treated. These incompatible wastes will be treated separately following a system change over. The system changeover process shall include the following tasks, all wastes in the feed system will be processed through the ATDU, all process water will be evacuated from the system and treated through the process water treatment system, and all sludges accumulated in the sludge removal system will be removed and stored in accordance with the WAP. Evacuated residual sludges and process waters will be treated and/or managed in accordance with the WAP.

- ORU-2 SYSTEM OVERVIEW

2.1 Anaerobic Thermal Desorption Unit

The system is designed to separate the organic constituents from contaminated media in such a manner that they are preserved for collection and recycling. The Anaerobic Thermal Desorption Unit (ATDU) includes a rotating cylinder that is slightly inclined downward from the product feed end. This rotating cylinder is enclosed within an outer shell, within which heat is applied to the outside of the rotating cylinder. Either Landfill Gas or Propane will be used to fire the ATDU. Wastes inside the ATDU do not directly contact the heat source, and an inert atmosphere is maintained in the cylinder to prevent oxidation of the organic constituents. The indirectly heated cylinder vaporizes water and organics contained in the waste. The primary heat transfer mechanism is conduction through the cylinder wall.

2.2 ATDU Operating Conditions

The ATDU rotating cylinder operates under an inert anaerobic atmosphere, thereby preventing any oxidation or destruction of the hydrocarbon or chemical constituents. The inert anaerobic atmosphere is maintained during start-up and shutdown by purging the ATDU with steam to displace the oxygen. During normal operations, the water content of the feedstock is typically sufficient to generate enough water vapor to maintain the inert atmosphere inside the desorber and additional steam is therefore not required. The seals at the inlet and discharge ends of the rotary drum combined with the double tipping valve airlocks at either end maintain a non-oxidizing atmosphere in which the waste can be safely vaporized.

An oxygen sensor connected to the SCADA control system is installed in the discharge end of the ATDU continuously monitors the oxygen concentration within the rotary drum which during normal operations is typically below 1 percent. The SCADA control system the oxygen sensor measures the oxygen concentration inside the drum, in the event the oxygen level increases above 1 percent, steam can be added to reduce the oxygen concentration down to normal levels. In the event the oxygen level rises above 5 percent this would constitute a malfunction condition, the SCADA system will automatically shut down the burners and stop feed into the ATDU.

2.3 ATDU Shutdown Strategy

The system is shutdown employing three scenarios; these are Normal. Malfunction, and Emergency scenarios. The following is a discussion for each scenario;

2.3.1 Emergency Shutdown

Emergency shutdowns are required for

- Feed to the ATDU system is shutdown, feed conveyor system are shutdown
- Burners shutdown
- ATDU shutdown.
- Thermal Oxidizer bypass valve set to open
- Thermal Oxidizer is shutdown

2.3.2 Normal Plant Shutdown

The normal shutdown procedure involves shutting down equipment from the feed end of the unit down through the discharge equipment, allowing adequate time for each conveyor or piece of equipment to fully discharge before proceeding to the next item. The rotary drum will be allowed to cool before drum rotation is stopped. During this cooldown period steam is added to ensure the anaerobic atmosphere inside the ATDU is maintained. After the unit has cooled the vapor recovery and ancillary support systems are shut down. Finally, the thermal oxidizer system is shutdown

2.3.3 Shutdown due to Malfunction

The ATDU system is programmed with both software and hardwired process interlocks to ensure components shut down automatically upon the failure or malfunction of any critical piece of process equipment. Failure of the system to maintain proper combustion in the furnace, process conditions in the ATDU or thermal oxidizer, or a failure of the material handling equipment downstream of the ATDU will cause the system to automatically switch off the combustion system, stop the feed of material into the unit. Should the malfunction involve the thermal oxidize, the system, will divert process vapors away from the thermal oxidizer until the upset condition can be remedied.

2.3.4 Emergency Plant Shutdown

Hardwired interlocks will initiate an emergency shutdown upon loss of primary electrical power, high oxygen concentration inside the ATDU or a runaway stack temperature in the ATDU furnace or Thermal Oxidizer Unit. Redundant gas safety valves installed on each burner spring fail closed if there is any loss in the numerous permissive conditions or interlocks that allow their opening. Feed to the plant is stopped automatically. In certain cases, the thermal oxidizer will remain running but should the emergency condition involve the thermal oxidizer, the system will divert process vapors away from the thermal oxidizer until the upset condition can be remedied. An uninterruptible power supply (UPS) supports the control system to allow the operator to monitor the system shutdown in the event of complete power loss.

2.4 Feed Systems

A below grade mixing hopper south of contaminant Building B5 receives untreated medias, moisture conditions them if necessary and feeds the waste through a series of conveyors to the ATDU for thermal separation. If desired this mixing hopper feed system can also pile the moisture conditioned media inside Building B-5 allowing for storage of the media inside the building. A second feed hopper inside the building is loaded by mechanical methods, the hopper feeds a debris screen which removes materials meeting the definition of debris contained in 40 CFR 268.45 from the waste. Oversize media separated by the screening system is classified as debris and is stored on the floor in containment Building B-5 for delivery to other treatment methods in accordance with Standalone #11 - *Debris Treatment Plan*. The undersize media is then fed through a series of conveyors to the ATDU for thermal separation. An arrangement of airlocks ensure that oxygen is not able to enter the unit during the process operation. The ORU Feed Systems are designed to maintain compliance with 40 CFR 61, Subpart FF (Benzene Waste Operations NESHAP, or BWON) control and treatment standards to manage BWON subject materials when required.

2.5 Treated Ash Systems

The ORU vaporizes organic contaminants contained in media and produces a treated ash that is cooled through jacketed cooling conveyors. A series of transfer conveyors route the processed solids to several separate discharge points in Building B-4, each discharge point will be used to create piles inside the containment building approximately 250 tons in size. Ash may also be stored in containment Building B-5 or in approved containers prior to disposal or further treatment. The ash from the treatment process can be landfilled once the waste meets LDR limits in 40 CFR 268.7. Ash that does not meet the constituent specific LDRs is further treated and cleared before disposal. Confirmation testing is completed in accordance with Standalone #1- *Waste Analysis Plan*.

2.6 Vapor Recovery System

The organic vapors and water are gasified inside the rotating cylinder, and conveyed to a condensing system. The condensing system uses process water to quench the organic vapors. Once quenched the resulting quench water is separated into an organic fraction and a water fraction. The organic fraction separated from the treated wastes can be generally classified in two categories;

2.6.1 Petroleum Fractions

The condensed and separated organic fraction for wastes with recoverable petroleum fraction is not regulated according to 40 CFR 261.6(a)(3)(iv)(C), and is transferred to one of three product storage tanks in the tank farm area. Organic fraction product for these wastes is recycled as a commodity depending on makeup.

2.6.2 Non-Petroleum Fractions

The condensed organic fraction for wastes without recoverable petroleum fractions is subject to the disposal requirements contained in 40 CFR 268 and are managed in accordance with *Standalone #1 – Waste Analysis Plan*. The condensed organic fraction is transferred as process water to the water treatment system in the tank farm area.

2.7 Settled Solids

Settled solids which accumulate in the vapor recovery sump are conveyed out of the sump into a closed hopper. These accumulated solids may be reintroduced back into the ORU feed system for treatment using pumps or mechanical means. In some cases, a centrifuge may be used to dewater these solids for shipment offsite for additional treatment. Liquids separated in the centrifuging process are introduced back into the process water for reuse and/or final treatment.

2.8 Process Water System

Reclaimed commodities are separated from the process water fraction in the oil water separator. Process water is recycled back into the system, and any residual water condensed out of the incoming waste is stored in the process water tank. Residual process water is transferred to surge tanks in the tank farm area. Process water is treated through an onsite water treatment system in the tank farm area with sand and carbon filtration. Chemical treatment prior to filtration may be required for some waste streams. Treated process water meeting LDR requirements may be reused for moisture conditioning of wastes in the solidification and stabilization process, or sent to the facilities solar evaporation ponds.

2.9 Air Emission Controls

Any residual non-condensable organic vapors are passed through a thermal oxidizer for complete destruction. The thermal oxidizer operation and performance is regulated by the facilities ACDP permit.

- ORU-2 SYSTEM TANKS

The following twenty-one (21) tanks are used in the ORU treatment system. Tank numbers listed below coincide with tank numbers provided on the flow diagram in Appendix B. All hazardous waste storage tanks associated with the ORU treatment system are managed in accordance with Standalone #8 – *Bulk Storage Plan*.

Table 22-3: ORU-2 Tank Listing

TANK #	DESCRIPTION	TYPE	CAPACITY (Gal)
RCRA Tanks			
F-1301	Interceptor	Above ground, horizontal, flat bottom, CS	3,000
F-1401	Oil Water Separator	Above ground, horizontal, cone bottom, CS	13,200
F-1402	Process Water Tank	Above ground, vertical, cone bottom, CS	20,000
F-1403	Process Water Mix Tank 1	Above ground, vertical, cone bottom, CS	20,000
F-1404	Process Water Mix Tank 2	Above ground, vertical, cone bottom, CS	20,000
F-1405	Treated Process Water Tank 1	Above ground, vertical, cone bottom, CS	20,000
F-1406	Treated Process Water Tank 2	Above ground, vertical, cone bottom, CS	20,000
F-1407	Treated Process Water Tank 3	Above ground, vertical, cone bottom, CS	20,000
F-1408	Treated Process Water Tank 4	Above ground, vertical, cone bottom, CS	20,000
F-1409	Treated Process Water Tank 5	Above ground, vertical, cone bottom, CS	20,000
F-1410	Treated Process Water Tank 6	Above ground, vertical, cone bottom, CS	20,000
F-1411	Treated Process Water Tank 7	Above ground, vertical, cone bottom, CS	20,000
F-1412	Treated Process Water Tank 8	Above ground, vertical, cone bottom, CS	20,000
F-1413	Treated Process Water Tank 9	Above ground, vertical, cone bottom, CS	20,000
F-1414	Treated Process Water Tank 10	Above ground, vertical, cone bottom, CS	20,000
F-1415	Treated Process Water Tank 11	Above ground, vertical, cone bottom, CS	20,000
F-1416	Treated Process Water Tank 12	Above ground, vertical, cone bottom, CS	20,000
ME-1101	Mix Hopper A	Above Ground Mix/Feed Hopper, CS	7,473
ME-1102	Feed Hopper B	Above Ground Feed Hopper	1,742
V-1401A	Sand Filter A	Above Ground Sand Filter A	100
V-1401B	Sand Filter B	Above Ground Sand Filter B	100
V-1402	Carbon Filter	Stainless Steel	3,950
Non-RCRA Tanks			
F-1417	Product Tank 1	Above ground, vertical, cone bottom, CS	20,000
F-1418	Product Tank 2	Above ground, vertical, cone bottom, CS	20,000
F-1419	Product Tank 3	Above ground, vertical, cone bottom, CS	20,000

- SYSTEM SECONDARY CONTAINMENT

The ORU-2 System containment is made up of 5 separate containment systems as listed below:

Table 22-4: ORU-2 System Containment

Site Plan Identifier	Area Description	Construction	Required Containment	Actual Containment
C	ORU System Equipment	Reinforced Concrete	3,739.3 ft^3	4,101.3 ft^3
B3	Product Tank Storage	Reinforced Concrete	2,948.6 ft^3	3,152.5 ft^3
B2	Process Water Treatment Area	Reinforced Concrete	2,932.1 ft^3	3,502.5 ft^3
B1	Treated Water Storage	Reinforced Concrete	3,433.3 ft^3	6,265.2 ft^3
D	Mixing Hopper Vault	Reinforced Concrete	1,018.4 ft^3	9,781.3 ft^3
A	Truck Offload Area	Reinforced Concrete	120 ft^3	159.8 ft^3

All ORU-2 containment areas are designed to meet the requirements contained in 40 CFR §264.193. 40 CFR §264.193(e)(2) requires that the secondary containment areas be large enough to contain the capacity of the largest tank plus precipitation from a 25-year, 24-hour storm, (refer to Appendix C for containment calculations). All joints in containment slabs are constructed with chemical-resistant waterstops meeting the requirements of 40 CFR §264.193(e)(2)(iii)). The slab is coated with a chemically compatible impermeable coating meeting the requirements of 40 CFR §264.193(e)(2)(iv)). Stormwater collected from the sumps in these containment areas will be pumped to the process water system and ultimately treated through the process water treatment system. The P.E. certification of the containment structures and tanks required by 40 CFR 264.192(b) will be maintained at the facility in the operating record.

- ORU-2 OPERATIONS

5.1 Organic Recovery Unit Contaminated Waste Handling

Following arrival and acceptance of the waste, the wastes are either stored in approved storage areas or fed directly into the treatment system through two feed hoppers in the system.

5.2 Subpart CC Waste Handling

Wastes subject to Subpart CC Level 1 controls will be stored or accepted in roll-off boxes and dump type vehicles may be placed on the slab floor in Containment Building B-5. Wastes subject to Subpart CC Level 2 controls will remain in the Level 2 shipping containers in accordance with Standalone # 9 - *Container Storage Design and Operations Plan* until they are transferred to the ORU-2 outside mixing feed hopper and amended with drying agents as necessary. Wastes with higher moisture contents may also be mixed with dryer materials in the mixing feed hopper or inside Building B-5 to attain appropriated moisture content.

5.3 Subpart FF Waste Handling

CWMNW tracks the facility's Total Annual Benzene (TAB) and it has historically been less than 1 Mg; therefore, CWMNW is not subject to controls in Subpart FF. However, in the event that generators require their specific wastes to be managed under controls, wastes subject to 40 CFR 61, Subpart FF may be handled in controlled containers such as roll off boxes until the material is transferred into the ORU-2 mixing feed hopper. These wastes will be maintained in containers that meet BWON control requirements, and shall be inspected and monitored in order to comply with all related standards. The vapors throughout the ORU feed system are routed through closed-vent systems to control devices, and all the equipment and piping lines are subject to BWON inspection and monitoring requirements.

5.4 Waste Preparation for Organic Recovery

In general, waste preparation improves the ability of the ORU-2 to treat the contaminated waste. This preparation includes specific operations for screen sizing and size reduction that are also dependent on the uniformity, moisture, and liquid content of the incoming contaminated waste.

Screening (vibrating or non-vibrating) is a primary operation, and wastes are screened or strained to remove debris. Blending low and high concentration waste or high and low boiling point wastes optimizes the operation and reduces problems in liquids recovery.

5.5 Organic Recovery Unit Treatment Capacity ORU-2

The indirect-fired ATDU has an ultimate design capacity of 30 million British thermal units (30 MMBtu), and a theoretical heat transfer efficiency of 60-percent. The temperature capacity of the system is 1,200°F. The actual operating temperatures vary depending upon the boiling points of the organic constituents being extracted such that optimal fuel consumption is maintained.

The theoretical treatment capacity of the system (tons/hour) depends primarily upon the moisture content of the waste and the thermal capacity of the ATDU. Appendix D provides the estimated treatment capacity of the system running at 900° F, based upon the moisture content of incoming waste, and using a thermal transfer efficiency of 60-percent.

- ORU-2 REGULATORY STANDARDS

6.1 Organic Recovery Unit - 40 CFR Part 264 Subparts J/X Compliance

6.1.1 40 CFR Part 264, Subpart J Compliance

The ORU contains process water tanks that store and/or treat hazardous waste and are subject to 40 CFR Part 264, Subpart J. These tanks are managed in compliance with Standalone #8 - *Bulk Storage Plan*, which contains requirements for inspection and operation of these tanks. The hazardous waste storage tank systems in both of the ORU systems have been adequately designed, have sufficient structural integrity, and are acceptable for storing hazardous waste. Required engineer's certifications are contained in Standalone #8 - *Bulk Storage Plan*. Further, the tanks are provided with sufficient secondary containment meeting the requirements of 40 CFR 264.193. Containment calculations for the system are shown in Appendix C. All tanks associated with the ORU are included in Standalone #8 - *Bulk Storage Plan*, which includes all permitted RCRA tanks at the facility.

In the event of any leak or spill from a tank system or secondary containment system, the facility shall comply with response requirements per 40 CFR 264.196. Closure and post-closure care of the hazardous waste tank systems are discussed in Standalone #5 – *Closure/Post-Closure Plan*.

6.1.2 40 CFR Part 264, Subpart X Compliance

The ORU-2 treatment system contains a thermal desorption unit (TDU) and shaker screen equipment that is subject to 40 CFR Part 264, Subpart X. These miscellaneous units are most similar to tank systems; and thus, the applicable and appropriate provisions of 40 CFR Part 264, Subpart J shall be complied with to ensure protection of human health and the environment. Standalone #23 – Subpart X units includes these pieces of equipment.

6.2 Routine Tank Inspections

The elements and frequency of routine inspections of ORU-2 systems hazardous waste tanks, piping and containment are included in Standalone #3 - *Inspection Plan*. The tanks and piping shall be inspected for visible leaks and general condition. The overfill alarm systems shall be tested to insure they are in working order. The containment area and sumps shall be inspected for evidence of any liquid collection and evidence of any leakage from the associated pipes, pumps, tanks and equipment contained within the area. An inspection form for both the ORU systems tanks, piping and containment is contained in Standalone #3 - *Inspection Plan*.

6.3 RCRA Subparts AA, BB and CC and Benzene NESHAPS - Applicability and Compliance for Organic Recovery Systems

6.3.1 40 CFR Part 264, Subpart AA Applicability

40 CFR Part 264, Subpart AA defines the air emission standards for process vents associated with distillation, fractionation, thin-film evaporation, solvent extraction, or air or steam stripping operations. ORU-2 does not contain any distillation, fractionation, thin-film evaporation, solvent

extraction, or air or steam streaming operation; and thus, 40 CFR Part 264, Subpart AA does not apply to either ORU Treatment system and subsystems.

6.3.2 40 CFR Part 264, Subpart BB Applicability and Compliance

ORU-2 systems are subject to the requirements of 40 CFR Part 270; and thus, all equipment that contains or contacts hazardous waste with organic concentrations of at least 10 percent by weight is subject to 40 CFR Part 264, Subpart BB. Compliance requirements for 40 CFR Part 264, Subpart BB is discussed in the Organic Recovery Unit Controls and Monitoring section below

6.3.3 40 CFR Part 264, Subpart CC Applicability

The requirements of 40 CFR Part 264, Subpart CC apply to owners and operators of all facilities that treat, store, or dispose of hazardous waste in tanks, surface impoundments, or containers subject to 40 CFR Part 264, Subparts I, J, or K. As discussed in Section 3.6.1, the ORU does contain hazardous waste storage tanks subject to 40 CFR Part 264, Subpart J; however, per 40 CFR 264.1080(b)(7), the requirements of 40 CFR Part 264, Subpart CC do not apply to a hazardous waste management unit that the owner or operator certifies is equipped with and operating air emission controls in accordance with the requirements of an applicable Clean Air Act regulation codified under 40 CFR Part 60, Part 61, or Part 63. All hazardous waste storage tanks in the ORU are equipped with and operate with air emission controls in accordance with 40 CFR Part 61, Subpart FF; and thus, the hazardous waste storage tanks in the ORU are not subject to 40 CFR Part 264, Subpart CC. All 40 CFR Part 264, Subpart CC requirements, if any, are contained in the facilities ACDP Permit.

Subpart CC regulations are applicable to containers which are not handled in accordance with 40 CFR Part 61, Subpart FF, having a design capacity greater than 0.1 m^3 (approximately 26 gallons), and containing hazardous waste that has an average volatile organic (VO) concentration greater than 500 ppm by weight (ppmw) at the point of waste generation. Waste received at the facility for ORU treatment will typically arrive or be placed in containers that are larger than the exempted capacity and may contain hazardous waste with VO concentrations greater than 500 ppmw. CWMNW complies with Subpart CC container standards as provided in the Permit and Standalone # 9 - *Container Storage Design and Operations Plan*. In addition, the waste in any container is unloaded in an expedient manner to minimize potential organic air emissions. If, for any reason, unloading of the contaminated waste does not commence immediately, the container is to be kept covered with a lid that meets Subpart CC Level 1 controls. The lid or cover forms a continuous barrier over the entire surface area with no visible cracks, holes, gaps or other open spaces.

6.3.4 40 CFR Part 61, Subpart FF Applicability and Compliance

The ORU at certain times is subject to 40 CFR Part 61, Subpart FF (BWON), since it is part of a facility that intermittently treats, stores, and disposes of BWON wastes from chemical plants and petroleum refineries where the regulation does apply. CWMNW tracks the facility's Total Annual Benzene (TAB), and has historically been less than 1 Mg. Therefore, CWMNW facility is not subject to controls in Subpart FF. However, should the generator require their specific wastes be managed under controls, wastes subject to 40 CFR 61, Subpart FF may be handled in controlled containers such as roll off boxes until the material is loaded into the mixing feed hopper. These wastes shall be maintained in containers that meet BWON control requirements, and shall be inspected and monitored as to comply with all related standards. The vapors throughout the ORU-2 feed system are routed through closed-vent systems to control devices, and all the equipment and piping lines are subject to BWON inspection and monitoring requirements.

All fixed-roof tanks shall have no detectable emissions in accordance with Method 21 standards and must be closed and sealed unless it is opened for sampling, inspections, maintenance, repair or removal of the waste. All organic vapors that are vented shall be maintained in a closed-vent system that routes to the thermal oxidizer control device.

In instances where the tank is venting to the atmosphere by a pressure relief device, these devices must remain in closed, sealed positions during normal operations. They may be opened if it is necessary to prevent damage or permanent disfiguration to tank, during filling or emptying, or during malfunctions. This follows the alternative standard for tanks under 40 CFR 61.351, allowing tanks handling primarily organic material to have only a pressure relief device.

The oil water separator in the ORU system is vented to the closed vent system and to the thermal oxidizer control device.

- ORU-2 CONTROLS AND MONITORING

The entire ORU-2 unit is centrally-monitored and controlled using a SCADA control package. The computer-based process controls provide graphic screens for effective plant control, monitoring, and data storage. The ORU-2 SCADA control system allow real-time access to all key plant parameters, and records the required operating parameters for compliance with the Part B permit and the ACDP permit. The demonstrated compliance SCADA system records the following parameters:

- Monitoring point CP1 - TDU Flue gas temperature - Deg F
- Monitoring point CP2 - TDU Syngas temperature - Deg F
- Monitoring point CP3 – TDU Infeed rate - TPH
- Monitoring point CP4 - Thermal oxidizer chamber temperature - Deg F
- Monitoring Point CP5 - Thermal oxidizer feed valve position – Open/Closed

The SCADA process controls enable the operator to improve system capacity, optimize fuel consumption, and protect the system against accidental malfunctions. The computerized system includes automatic fail safes for controlled shutdown of the system during upsets.

The process instrumentation and electrical switch gear is housed in a motor control center. The SCADA control system and operators control station is located in the control room south of the thermal processing system. Plant operators are trained in the operational and maintenance aspects of the system and these requirements are contained in Standalone #2 - *Security Procedures, Hazard Prevention, and Training Plan.*

7.1 Control Device Monitoring

The emissions control devices throughout the ORU system require monitoring of several different parameters, and the requirements for these are established in the facilities ACDP permit. The facility shall manage leaks identified by regular inspections in compliance with the requirements in 40 CFR Part 264.1064.

7.2 Tank Monitoring

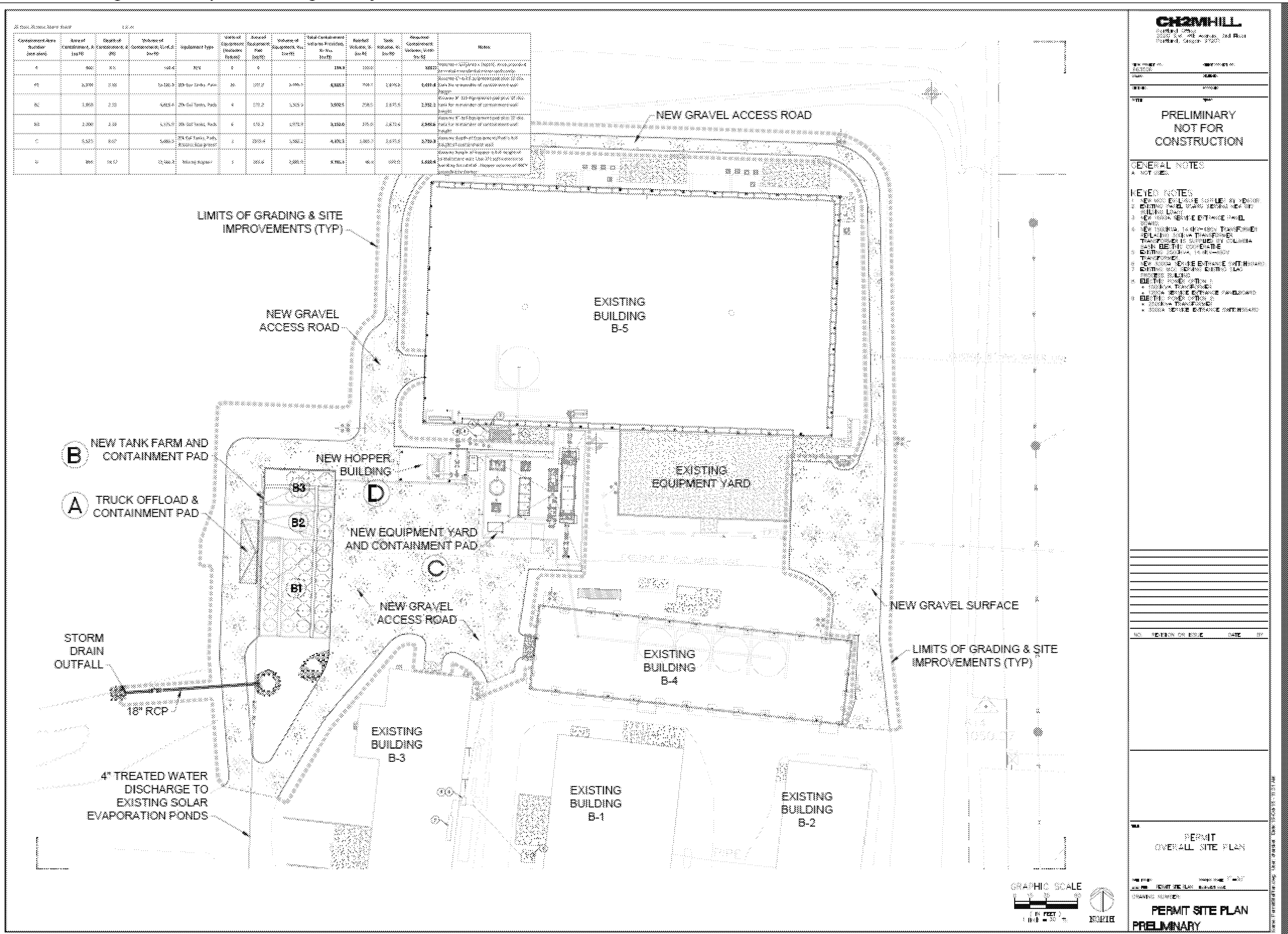
As indicated in Section 3.6.3, all hazardous waste storage tanks in the ORU-2 system are equipped with and operate with air emission controls in accordance with 40 CFR Part 61, Subpart FF; and thus, the hazardous waste storage tanks in the ORU-2 system are not subject to 40 CFR Part 264, Subpart CC. The facility shall comply with all applicable requirements under 40 CFR Part 61, Subpart FF. All hazardous waste tanks are equipped with a fixed roof cover and shall be visually inspected by the owner and operator quarterly, and monitored via Method 21 annually. If leaks are detected, responses and recordkeeping shall be made in compliance with 40 CFR Part 264, Subpart BB and 40 CFR 264.1064.

7.3 Other Equipment Monitoring

The ORU-2 is in heavy liquid service, and all pumps, valves, and pressure relief devices shall be observed for potential leaks using the following methods: Audible, Visual, and Olfactory (AVO), per 40 CFR Part 264, Subpart BB. There is no stated monitoring frequency for equipment in heavy liquid service according to 40 CFR Part 264, Subpart BB; however, monitoring shall be conducted quarterly consistent with industry best management practices, and to satisfy the BWON quarterly visual inspection requirements. When a leak is discovered, 40 CFR Part 60, Method 21 shall be used to measure the severity.

All sampling stations within ORU-2 system shall be built and kept up to design and installation requirements in order to stay compliant with 40 CFR, Subpart BB. All operational open-ended lines or pipes shall have a cap, plug, or double valve system when not in use.

APPENDIX A
AS-BUILT DESIGN PLANS FOR ORU-2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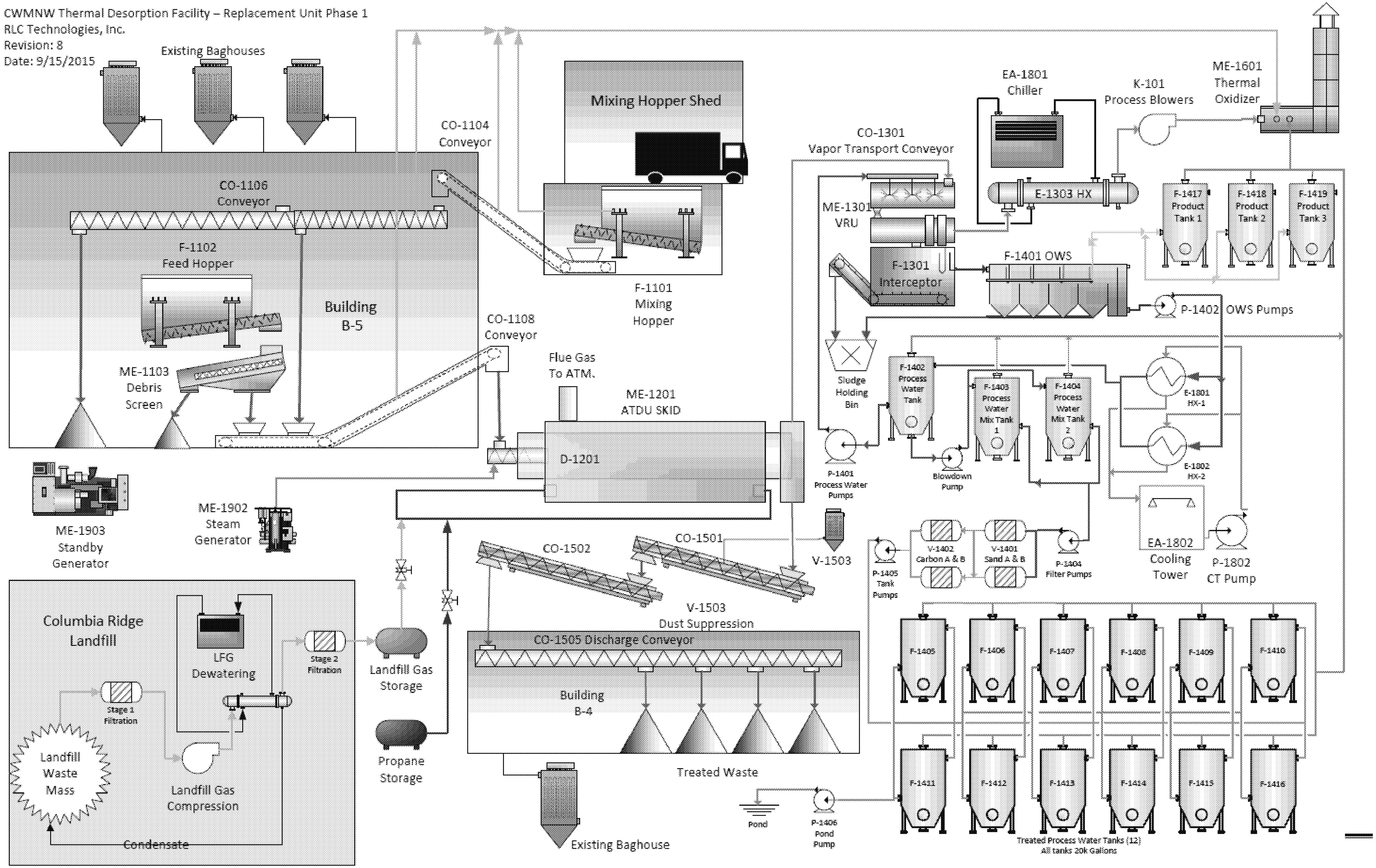
PRELIMINARY
NOT FOR
CONSTRUCTION
GENERAL NOTES
KEYED NOTES
NEW GRAVEL ACCESS ROAD
LIMITS OF GRADING & SITE IMPROVEMENTS (TYP)
NEW GRAVEL ACCESS ROAD
EXISTING BUILDING B-5
B NEW TANK FARM AND CONTAINMENT PAD
A TRUCK OFFLOAD & CONTAINMENT PAD
NEW HOPPER BUILDING
D
B3
B2
B1
EXISTING EQUIPMENT YARD
NEW EQUIPMENT YARD AND CONTAINMENT PAD
C
NEW GRAVEL ACCESS ROAD
NEW GRAVEL SURFACE
STORM DRAIN OUTFALL
18" RCP
EXISTING BUILDING B-4
LIMITS OF GRADING & SITE IMPROVEMENTS (TYP)
EXISTING BUILDING B-3
4" TREATED WATER DISCHARGE TO EXISTING SOLAR EVAPORATION PONDS
EXISTING BUILDING B-1
EXISTING BUILDING B-2
GRAPHIC SCALE
NORTH
PERMIT
OVERALL SITE PLAN
PERMIT SITE PLAN
PRELIMINARY

APPENDIX B
PROCESS FLOW DIAGRAM


CWMNW Thermal Desorption Facility – Replacement Unit Phase 1
RLC Technologies, Inc.
Revision: 8
Date: 9/15/2015
Existing Baghouses
CO-1104 Conveyor
Mixing Hopper Shed
CO-1106 Conveyor
F-1102 Feed Hopper
Building B-5
ME-1103 Debris Screen
CO-1108 Conveyor
F-1101 Mixing Hopper
Flue Gas To ATM.
ME-1201 ATDU SKID
D-1201
ME-1903 Standby Generator
ME-1902 Steam Generator
CO-1301 Vapor Transport Conveyor
ME-1301 VRU
F-1301 Interceptor
EA-1801 Chiller
E-1303 HX
K-101 Process Blowers
ME-1601 Thermal Oxidizer
F-1417 Product Tank 1
F-1418 Product Tank 2
F-1419 Product Tank 3
F-1401 OWS
P-1402 OWS Pumps
Sludge Holding Bin
F-1402 Process Water Tank
F-1403 Process Water Mix Tank 1
F-1404 Process Water Mix Tank 2
E-1801 HX-1
E-1802 HX-2
P-1401 Process Water Pumps
Blowdown Pump
V-1503
V-1402 Carbon A & B
V-1401 Sand A & B
P-1404 Filter Pumps
P-1405 Tank Pumps
EA-1802 Cooling Tower
P-1802 CT Pump
CO-1502
CO-1501
V-1503 Dust Suppression
CO-1505 Discharge Conveyor
Building B-4
Treated Waste
Existing Baghouse
Columbia Ridge Landfill
LFG Dewatering
Stage 1 Filtration
Stage 2 Filtration
Landfill Waste Mass
Landfill Gas Compression
Condensate
Landfill Gas Storage
Propane Storage
Pond
P-1406 Pond Pump
F-1405
F-1406
F-1407
F-1408
F-1409
F-1410
F-1411
F-1412
F-1413
F-1414
F-1415
F-1416
Treated Process Water Tanks (12)
All tanks 20k Gallons

APPENDIX C
SECONDARY CONTAINMENT CALCULATIONS

25 Year, 25 Hour Storm Event *1.5 in*

Containment Area Number (see plan)	Area of Containment, A (sq ft)	Depth of Containment, d (ft)	Volume of Containment, V_c=A.d (cu ft)	Equipment Type	Units of Equipment (includes Future)	Area of Equipment Pad (sq ft)	Volume of Equipment, V_{eq} (cu ft)	Total Containment Volume Provided, V_c-V_{eq} (cu ft)	Rainfall Volume, V_r (cu ft)	Tank Volume, V_t (cu ft)	Required Containment Volume, V_r+V_t (cu ft)	Notes
A	960	0.5	159.8	N/A	0	0	-	159.8	120.0	-	120.0	Volume = 1/3(Area x Depth). Area provided to contain incidental minor spills only.
B1	6,078	2.33	14,160.8	20k Gal Tanks, Pads	24	172.2	7,895.5	6,265.2	759.7	2,673.6	3,433.3	Assume 6"-tall Equipment pad plus 12' dia. tank for remainder of containment wall height
B2	2,068	2.33	4,818.4	20k Gal Tanks, Pads	4	172.2	1,315.9	3,502.5	258.5	2,673.6	2,932.1	Assume 6"-tall Equipment pad plus 12' dia. tank for remainder of containment wall height
B3	2,200	2.33	5,125.9	20k Gal Tanks, Pads	4	172.2	1,973.9	3,152.0	275.0	2,673.6	2,948.6	Assume 6"-tall Equipment pad plus 12' dia. tank for remainder of containment wall height
C	8,525	0.67	5,683.5	20k Gal Tanks, Pads, Process Equipment	1	2373.4	1,582.2	4,101.3	1,065.7	2,673.6	3,739.3	Assume depth of Equipment/Pad is full height of containment wall
D	894	14.17	12,666.3	Mixing Hopper	1	203.6	2,885.0	9,781.3	46.4	972.0	1,018.4	Assume height of hopper is full height of containment wall. Use 371 sqft exterior to building for rainfall. Hopper volume of 36CY provided by Owner.

APPENDIX D
TDU SYSTEM CAPACITY

RLC Technologies TDU System Capacity 30.0 MMBTU/HR

MMBTU/HR Required

% Water	Tons per Hour 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
0%	0.692	1.383	2.075	2.767	3.458	4.150	4.842	5.533	6.225	6.917	7.608	8.300	8.992	9.683	10.375	11.067	11.758	12.450	13.142	13.833
5%	0.898	1.796	2.694	3.591	4.489	5.387	6.285	7.183	8.081	8.979	9.877	10.774	11.672	12.570	13.468	14.366	15.264	16.162	17.060	17.957
10%	1.104	2.208	3.312	4.416	5.520	6.624	7.729	8.833	9.937	11.041	12.145	13.249	14.353	15.457	16.561	17.665				
15%	1.310	2.621	3.931	5.241	6.551	7.862	9.172	10.482	11.792	13.103	14.413	15.723	17.034							
20%	1.516	3.033	4.549	6.066	7.582	9.099	10.615	12.132	13.648	15.165	16.681									
25%	1.723	3.445	5.168	6.891	8.613	10.336	12.059	13.781	15.504	17.227										
30%	1.929	3.858	5.787	7.716	9.644	11.573	13.502	15.431	17.360											
35%	2.135	4.270	6.405	8.540	10.675	12.811	14.946	17.081												
40%	2.341	4.683	7.024	9.365	11.706	14.048	16.389													
45%	2.547	5.095	7.642	10.190	12.737	15.285	17.832													
50%	2.754	5.507	8.261	11.015	13.769	16.522														
55%	2.960	5.920	8.880	11.840	14.800	17.759														
60%	3.166	6.332	9.498	12.664	15.831															
65%	3.372	6.745	10.117	13.489	16.862															
70%	3.579	7.157	10.736	14.314	17.893															
75%	3.785	7.569	11.354	15.139																
80%	3.991	7.982	11.973	15.964																
85%	4.197	8.394	12.591	16.788																
90%	4.403	8.807	13.210	17.613																
95%	4.610	9.219	13.829																	
100%	4.816	9.631	14.447																	

**** **MMBTU/HR required estimates above use 60% Thermal Transfer Efficiency and 900Deg F operating temperatures**